

## WHAT IS CLAIMED IS:

1. A band rejection filter with poles comprising:  
a plurality of series resonant circuits having end  
5 terminals connected in common and other end terminals  
connected in series via a plurality of transmission lines each  
having a length that is an odd multiple of about a one-quarter  
wavelength at a resonance frequency of the plurality of series  
resonant circuits; and  
10 a jump-coupling circuit for roughly coupling two of said  
plurality of series resonant circuits, which are not adjacent  
to each other, to each other.

2. The band rejection filter with poles according to  
15 Claim 1, wherein said jump-coupling circuit includes a  
capacitor, a transmission line having a length that is an odd  
multiple of about the one-quarter wavelength at the resonance  
frequency of the plurality of series resonant circuits, and  
another capacitor, which are connected in series.

20 3. The band rejection filter with poles according to  
Claim 2, wherein each of said plurality of transmission lines,  
said plurality of series resonant circuit, and said  
transmission line included in said jump-coupling circuit is  
25 formed of a microstrip line, a slot line, or a coplanar line,  
which is formed on a dielectric substrate, and each of said  
capacitor and said other capacitor consists of a chip capacitor,  
a gap capacitor formed of a transmission line, or an  
interdigital capacitor.

4. The band rejection filter with poles according to Claim 1, wherein said jump-coupling circuit includes a high impedance line having a length that is an odd multiple of about the one-quarter wavelength at the resonance frequency of the plurality of series resonant circuits, a low impedance line having substantially the same length as said high impedance line, and another high impedance line having substantially the same length as said high impedance line, which are connected in series.

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5. The band rejection filter with poles according to Claim 4, wherein each of said plurality of transmission lines, said plurality of series resonant circuits, said high impedance line, said low impedance line, and said other high impedance line is formed of a microstrip line, a slot line, or a coplanar line which is formed on a dielectric substrate.

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6. The band rejection filter with poles according to Claim 1, wherein said jump-coupling circuit includes a capacitor.

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7. The band rejection filter with poles according to Claim 6, wherein each of said plurality of transmission lines and said plurality of series resonant circuits is formed of a microstrip line, a slot line, or a coplanar line, which is formed on a dielectric substrate, and said capacitor consists of a chip capacitor, a gap capacitor formed of a transmission line, or an interdigital capacitor.

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8. A band rejection filter with poles comprising:

a plurality of parallel resonant circuits connected in series via a plurality of transmission lines each having a length that is an odd multiple of about a one-quarter wavelength at a resonance frequency of the plurality of parallel resonant circuits; and

a jump-coupling circuit for roughly coupling two of said plurality of parallel resonant circuits, which are not adjacent to each other, to each other.

9. The band rejection filter with poles according to Claim 8, wherein said jump-coupling circuit includes a capacitor, a transmission line having a length that is an odd multiple of about the one-quarter wavelength at the resonance frequency of the plurality of parallel resonant circuits, and another capacitor, which are connected in series.

10. The band rejection filter with poles according to Claim 9, wherein each of said plurality of transmission lines and said transmission line included in said jump-coupling circuit is formed of a microstrip line, a slot line, or a coplanar line, which is formed on a dielectric substrate, and each of said capacitor and said other capacitor consists of a chip capacitor, a gap capacitor formed of a transmission line, or an interdigital capacitor.

11. The band rejection filter with poles according to Claim 9, said plurality of transmission lines consist of a rectangular waveguide, each of said plurality of parallel resonant circuits consists of a dielectric resonator that is electromagnetically coupled, via a coupling hole formed in a

wider wall face of said rectangular waveguide, with said rectangular waveguide, said transmission line included in said jump-coupling circuit consists of a jump-coupling waveguide disposed in a narrower wall face of said rectangular waveguide, and each of said capacitor and said other capacitor consists of a coupling hole formed in the narrower wall face of said rectangular waveguide.

12. The band rejection filter with poles according to Claim 8, wherein said jump-coupling circuit includes a high impedance line having a length that is an odd multiple of about the one-quarter wavelength at the resonance frequency of the plurality of parallel resonant circuits, a low impedance line having substantially the same length as said high impedance line, and another high impedance line having substantially the same length as said high impedance line, which are connected in series.

13. The band rejection filter with poles according to Claim 12, wherein each of said plurality of transmission lines, said high impedance line, said low impedance line, and said other high impedance line is formed of a microstrip line, a slot line, or a coplanar line which is formed on a dielectric substrate.

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14. The band rejection filter with poles according to Claim 12, wherein said plurality of transmission line consist of a rectangular waveguide, each of said plurality of parallel resonant circuits consists of a dielectric resonator that is electromagnetically coupled, via a coupling hole formed in a

wider wall face of said rectangular waveguide, with said rectangular waveguide, each of said high impedance line and said other high impedance line consists of a narrower and thicker jump-coupling waveguide disposed in a narrower wall  
5 face of said rectangular waveguide, and said low impedance line consists of a wider and thinner jump-coupling waveguide disposed in the narrower wall face of said rectangular waveguide.

10 15. The band rejection filter with poles according to Claim 8, wherein said jump-coupling circuit includes a capacitor.

15 16. The band rejection filter with poles according to Claim 15, wherein each of said plurality of transmission lines is formed of a microstrip line, a slot line, or a coplanar line, which is formed on a dielectric substrate, and said capacitor consist of a chip capacitor, a gap capacitor formed of a transmission line, or an interdigital capacitor.